

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1-11. Cancelled.

12. (Currently amended): A polishing method for polishing a material comprising:

a substrate,

an interlaminar insulating film on said substrate, wherein a surface of said interlaminar insulation insulating film comprises dented portions and projected portions,

a barrier conductor layer coated along said surface of said interlaminar insulating film, wherein said barrier conductor layer comprises dented portions and projected portions corresponding to the dented portions and projected portions of said interlaminar insulation insulating film,

a conductive substance layer coated on said barrier conductor layer, wherein said conductive substance layer fills the dented portions of said barrier conductor layer and covers the projected portions of said barrier conductor layer,

said method comprising:

a first polishing step of polishing said conductive substance layer to expose projected portions of said barrier conductor layer; and

a second polishing step of chemically polishing and mechanically polishing at least the exposed projected portions of said barrier conductor layer and the conductive substance layer while supplying a polishing slurry [[of]] to expose the interlaminar insulating film at locations

corresponding to the projected portions of said interlaminar insulating film, with conductive substance layer at the dented portions of said barrier conductor layer remaining;

said polishing slurry comprising:

a metal-oxidizing agent; a metal anticorrosive agent; an oxidized metal dissolving agent; and water,

wherein the oxidized metal dissolving agent is at least one kind selected from the group consisting of an acid in which the negative value of the logarithm of the dissociation constant $[\text{[ka]}] \text{Ka}$ (pKa) of a first dissociable acid group is 3.5 or more, an ammonium salt of the acid and an organic acid ester of the acid, the pH of the polishing slurry is within the range of 3 to 4, and the concentration of the metal-oxidizing agent is within the range of 0.01 to 3 percent by weight.

13. (Original): The polishing method of claim 12, wherein the barrier conductor layer prevents the conductive substance from diffusing to the interlaminar insulating film, and the conductive substance is at least one of copper and a copper alloy.

14. (Previously presented): The polishing method of claim 12, wherein the barrier conductor layer is a single layer made of one kind or a lamination layer made of two kinds or more selected from the group consisting of tantalum, tantalum nitride, a tantalum alloy, titanium, titanium nitride, a titanium alloy, tungsten, tungsten nitride and a tungsten alloy.

15. (Previously presented): The polishing method of claim 12, wherein the concentration of the oxidizing agent is within the range of 0.01 to 1.5 percent by weight.

16. (Previously presented): The polishing method of claim 12, wherein the oxidized metal dissolving agent is an organic acid.

17. (Previously presented): The polishing method of claim 12, wherein said dented portions and projected portions are formed in a specified pattern.

18. (Previously presented): The polishing method of claim 17, wherein said dented portions are formed on the surface of the interlaminar insulating film by forming a resist layer and etching.

19-22. Cancelled.

23. (Currently amended): A polishing method of polishing a material comprising:
a substrate,
an interlaminar insulating film on said substrate, wherein a surface of said interlaminar insulating film comprises dented portions and projected portions,

a barrier conductor layer coated along said surface of said interlaminar insulating film, wherein said barrier conductor layer comprises dented portions and projected portions corresponding to the dented portions and projected portions of said interlaminar insulating film,

a conductive substance layer coated on said barrier conductor layer, wherein said conductive substance layer fills the dented portions of said barrier conductor layer and covers the projected portions of said barrier conductor layer,

said method comprising:
a first polishing step of polishing said conductive substance layer to expose projected portions of said barrier conductor layer; and
a second polishing step of chemically polishing and mechanically polishing at least the exposed projected portions of said barrier conductor layer and the conductive substance layer

while supplying a polishing slurry to expose the interlaminar insulating film at locations corresponding to the projected portions of said interlaminar insulating film, with conductive substance layer at the dented portions of said barrier conductor layer remaining,

said polishing slurry comprising:

a metal-oxidizing agent; a metal anticorrosive agent; [[and]] an oxidized metal dissolving agent; and water,

wherein the oxidized metal dissolving agent is at least one kind selected from the group consisting of an acid in which the negative value of the logarithm of the dissociation constant [[K_a]] K_a (p K_a) of a first dissociable acid group is 3.5 or more, an ammonium salt of the acid and an organic acid ester of the acid, the pH of the polishing slurry is within the range of 3 to 4 and the concentration of the metal-oxidizing agent is within the range of 0.01 to 3 percent by weight, and

wherein the barrier layer is selected from the group consisting of tantalum compounds and titanium compounds.

24. (Previously presented): The polishing slurry of claim 23, wherein the barrier layer is selected from the group consisting of tantalum, tantalum nitride, tantalum alloys, titanium, titanium nitride and titanium alloys.

25. (Currently amended): A polishing method for polishing a material comprising:

a substrate,

an interlaminar insulating film on said substrate, wherein a surface of said interlaminar insulating film comprises dented portions and projected portions,

a barrier conductor layer coated along said surface of said interlaminar insulating film wherein said barrier conductor layer comprises dented portions and projected portions corresponding to the dented portions and projected portions of said interlaminar insulating film,

a conductive substance layer coated on said barrier conductor layer, wherein said conductive substance layer fills the dented portions of said barrier conductor layer and covers the projected portions of said barrier conductor layer,

said method comprising:

a first polishing step of polishing said conductive substance layer to expose projected portions of said barrier conductor layer; and

a second polishing step of chemically polishing and mechanically polishing at least the exposed projected portions of said barrier conductor layer and the conductive substance layer while supplying a polishing slurry to expose the interlaminar insulating film at locations corresponding to the projected portions of said interlaminar insulating film, with conductive substance layer at the dented portions of said barrier conductor layer remaining,

said polishing slurry comprising:

a metal polishing slurry comprising:

a metal-oxidizing agent; a metal anticorrosive agent; [[and]] an oxidized metal dissolving agent; and water,

wherein the oxidized metal dissolving agent is at least one kind selected from the group consisting of an acid in which the negative value of the logarithm of the dissociation constant [[K_a]] K_a (p K_a) of a first dissociable acid group is 3.5 or more an ammonium salt of the acid and

an organic acid ester of the acid, the pH of the polishing slurry is within the range of 3 to 3.75, and the concentration of the metal-oxidizing agent is within the range of 0.01 to 3 percent by weight.

26. (Currently amended): A polishing method of polishing a material comprising:

a substrate,

an interlaminar insulating film on said substrate, wherein a surface of said interlaminar insulating film comprises dented portions and projected portions,

a barrier conductor layer coated along said surface of said interlaminar insulating film, wherein said barrier conductor layer comprises dented portions and projected portions corresponding to the dented portions and projected portions of said interlaminar insulating film,

a conductive substance layer coated on said barrier conductor layer, wherein said conductive substance layer fills the dented portions of said barrier conductor layer and covers the projected portions of said barrier conductor layer,

said method comprising:

a first polishing step of polishing said conductive substance layer to expose projected portions of said barrier conductor layer; and

a second polishing step of chemically polishing and mechanically polishing at least the exposed projected portions of said barrier conductor layer and the conductive substance layer while supplying a polishing slurry to expose the interlaminar insulating film at locations corresponding to the projected portions of said interlaminar insulating film, with conductive substance layer at the dented portions of said barrier conductor layer remaining,

said polishing slurry comprising:

a metal-oxidizing agent, a metal anticorrosive agent, [[and]] an oxidized metal dissolving agent, and water,

wherein the oxidized metal dissolving agent is at least one kind selected from the group consisting of an acid in which the negative value of the logarithm of the dissociation constant [[K_a]] K_a (pKa) of a first dissociable acid group is 3.5 or more, an ammonium salt of the acid and an organic acid ester of the acid, the pH of the polishing slurry is within the range of 3 to 4, and the concentration of the metal-oxidizing agent is within the range of 0.01 to 3 percent by weight, and

wherein the polishing slurry contains polishing particles having an average particle diameter of 100 nm or less.